

WHAT IS CLAIMED IS:

1. A damper system for a stage of a turbine comprising:

a shroud having a first surface defining in part a hot gas path through the turbine;

a shroud body for supporting said shroud;

a damper block having at least three projections raised from a surface thereof and engaging a backside surface of said shroud opposite said first surface; and

a damping mechanism carried by said shroud body and connected to said damper block for applying a load to said damper block and said shroud through the engagement of the projections with the backside surface of the shroud thereby damping vibratory movement of said shroud.

2. A system according to Claim 1 wherein two of said projections lie adjacent a forward edge of said damper block surface in an upstream direction relative to the direction of flow of hot gas through the turbine and a third projection of said at least three projections lies adjacent a rearward edge of said damper block surface intermediate sides of said damper block.

3. A system according to Claim 2 wherein said two projections are symmetrically located relative to opposite sides of said damper block and said third projection is asymmetrically located relative to said opposite sides.

4. A system according to Claim 1 wherein the damper block surface is spaced from the backside surface of the shroud by said projections to provide a thermal insulating layer between said shroud and said damper block.

5. A system according to Claim 1 wherein said shroud is formed of a ceramic material and said damper block is formed of a metallic material.

6. A system according to Claim 1 wherein said damping mechanism includes a spring and a piston biased by said spring to apply the load to said damper block.

7. A system according to Claim 6 including a housing for said spring in communication with a cooling medium for cooling the spring.

8. A system according to Claim 6 wherein said piston and said damper block are secured to one another by a ball-and-socket coupling and at least one cooling passage along said piston for supplying a cooling medium into the ball-and-socket coupling.

9. A system according to Claim 8 wherein the piston includes a plurality of film-cooling holes in communication with said one cooling passage for film-cooling the socket.

10. A system according to Claim 6 wherein said piston passes through an aperture in said shroud body and includes at least a pair of lands spaced from one another along a surface of the piston passing through the

aperture to minimize binding of the piston and shroud block due to oxidation and/or wear.

11. A system according to Claim 6 wherein said piston and said damper block have a ball and socket, respectively, forming a ball-and-socket coupling therebetween, and a pair of pins secured to said damper block to engage the ball of the piston and the socket of the damper block to secure the piston and damper block to one another.

12. A system according to Claim 6 including a washer about the piston and engaged by the spring, said washer being formed of a thermally insulating material.

13. A system according to Claim 6 including a cup-shaped housing for the spring, a cap at one end of said housing and one end of said spring bearing against said cap, an annular thermally insulating washer between an opposite end of the spring and a base of the cup-shaped housing and a cooling passage opening into said housing for cooling the spring.

14. A damper system for a stage of a turbine comprising:

a shroud formed of a ceramic material having a first surface defining in part a hot gas path through the turbine;

a shroud body for supporting said shroud;

a damper block carried by said shroud body and engaging said shroud, said damper block being formed of a metallic material; and

a damping mechanism carried by said shroud body and connected to said damper block for applying a load to said damper block and said shroud to dampen vibratory movement of said shroud, said damping mechanism including a spring for applying the load to the damper block.

15. A system according to Claim 14 including a housing for said spring in communication with a cooling medium for cooling the spring.

16. A system according to Claim 14 wherein said damping mechanism includes a piston, said damper block being secured to said piston by a ball-and-socket coupling and at least one cooling passage along said piston for supplying a cooling medium into the ball-and-socket coupling.

17. A system according to Claim 16 wherein the piston includes a plurality of film-cooling holes for film-cooling the socket.

18. A system according to Claim 16 wherein said piston passes through an aperture in said shroud body and includes at least a pair of lands spaced from one another along a surface of the piston passing through the aperture to minimize binding of the piston and shroud block due to oxidation and/or wear.

19. A system according to Claim 16 including a washer about the piston and engaged by the spring, said washer being formed of a thermally insulating material.

20. A system according to Claim 16 including a cup-shaped housing for the spring, a cap at one end of said housing and one end of said spring bearing against said cap, an annular thermally insulating washer between an opposite end of the spring and said piston, and a cooling passage opening into said housing for cooling the spring.